surfaces of the biomaterial and one of said first and second outer surfaces of said tissue substrate, . said energy absorbing material penetrating into the interstices of said biomaterial;

irradiating the energy absorbing material with light energy in said predetermined wavelength range with an intensity sufficient to fuse ~~to~~gether one of said first and second outer surfaces of the biomaterial and the ~~tissue substrate~~; and

fusing together the ~~selected~~ one of said first and second outer surfaces of the biomaterial and the tissue substrate.

2. The method of claim 1, which further includes the step of indirectly irradiating said energy absorbing material by directing the light energy first through the biomaterial or tissue substrate and then to the energy absorbing material.

3. The method of claim 1, wherein said energy absorbing material comprises a biocompatible chromophore.

4. The method of claim 1, wherein said energy absorbing material comprises an energy absorbing dye.

5. The method of claim 1, which further includes the step of substantially dissipating said energy absorbing material when said biomaterial and said tissue substrate are fused together.

6. The method of claim 1, which further includes the step of staining the first or second surface of said biomaterial with said energy absorbing material.

7. The method of claim 1, which further includes the step of applying said energy absorbing material to one of said outer surfaces of said biomaterial by doping a separate doped biomaterial layer with an energy absorbing material, and then fusing the separate doped biomaterial layer to the biomaterial.

F1

8. The method of claim 1, wherein the energy absorbing layer is substantially. uniformly applied to a selected one of said first and second outer surfaces of the biomaterial.

9. The method of claim 1, which further includes the step of covering substantially the entire outer surface of the biomaterial with the energy absorbing material.

10. The method of claim 1, which further includes the step of irradiating the energy absorbing material with light energy at a localized temperature of from about 40 to 600 degrees C. for period of time sufficient to cause fusing together of one of said first and second outer surfaces of the biomaterial and one of said first and second outer surfaces of said tissue substrate.

11. The method of claim 1, wherein the tissue substrate is a live tissue substrate.

12. The method of claim 1, wherein the average thickness of the energy absorbing material which penetrates into the interstices of the biomaterial is from about 0.5 to 300 microns.

13. The method of claim 1, which further includes the step of arranging the magnitude of the wave length, energy level, absorption, and light intensity during irradiation with light energy of the energy absorbing material, and the concentration of the energy absorbing material, so that the localized temperature at the interface of said first and second outer surfaces of the biomaterial and the tissue substrate are maintained at from about 40 to 600 °C., thereby fusing together the biomaterial and the tissue substrate.

14. Cancelled.

F2

15. The method of claim 1, wherein the tissue substrate is selected from a group consisting of bladders, intestines, tubes, esophagus, ureters, arteries, veins, stomachs, lungs, hearts, colons, and skin.

F2

16. The method of claim 1, which further includes the step of forming said biomaterial into a three-dimensional support structure wherein said biomaterial is combined with a stromal support matrix populated with actively growing stromal cells.

17. The method of claim 16, wherein the stromal support matrix comprises fibroblasts.

18. The method of claim 1, which further includes the step of forming a cellular lining of human cells on one of the major surfaces of said biomaterial layer.

19. (Amended) The method of claim 18, wherein said cells which are employed to form said cellular lining are at least one of endothelial cells, epithelial cells and urothelial cells.

20. The method of claim 1, which further includes the step of forming an inner lining consisting essentially of tropoelastin for mechanical human structures to ensure their continued internal use in a human body.

21. The method of claim 20, which further includes the step of forming said inner lining in heart valves, heart implants, dialysis equipment, or oxygenator tubing for heart-lung by-pass systems.

22. The method of claim 1, which includes the step of introducing a drug into said biomaterial.

Sub G2

23. A method for using a biomaterial as a tissue-fusible layer, comprising:
providing a layer of biomaterial having a first and second outer major surface;
providing a tissue substrate having a first and second outer major surface; and
using said said ~~biomaterial~~ as a heat fusible material by applying an energy absorbing material, which is energy absorptive within a predetermined range of light wavelengths, to one of said first and second outer surfaces of the biomaterial in an amount which will make said

biomaterial tissue-fusible, and which will cause fusing together of one of said first and second outer surfaces of the biomaterial and one of said first and second outer surfaces of said tissue substrate, said energy absorbing material being applied so that it will penetrate into the interstices of said biomaterial,

irradiating the energy absorbing material with light energy in said predetermined wavelength range with an intensity being sufficient to fuse together one of said first and second outer surfaces of the biomaterial and the tissue substrate.

24. A method for producing a biomaterial consisting essentially of tropoelastin fused onto a tissue substrate comprising:

providing a layer of said biomaterial having a first and second outer major surface and a tissue substrate having a first and second outer major surface;

applying an energy absorbing material, which is energy absorptive within a predetermined range of light wavelengths, to one of said first and second outer surfaces of the biomaterial in an amount which will cause fusing together of one of said first and second outer surfaces of the biomaterial and one of said outer surface of said tissue substrate, said energy absorbing material penetrating into the interstices of said biomaterial;

indirectly irradiating the energy absorbing material by directing the light energy first through the biomaterial or tissue substrate and then to the energy absorbing material, said light energy being in said predetermined wavelength range with an intensity sufficient to fuse together one of said first and second outer surfaces of the biomaterial and the outer surface of said tissue substrate; and

fusing together one of said first and second outer surfaces of the biomaterial and the outer surface of said tissue substrate and substantially dissipating said energy absorbing material when said biomaterial and said tissue substrate are fused together.

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25. Cancelled.

26. Cancelled.

27. Cancelled.

28. Cancelled.

29. Cancelled.

30. Cancelled.

31. Cancelled.

32. Cancelled.

33. Cancelled.

34. Cancelled.

35. Cancelled.

F3

36. A method for producing a prosthetic device comprising:

providing a biomaterial layer consisting essentially of tropoelastin and a support member comprising a stent, a conduit or a scaffold; and

applying said layer of biomaterial to said support member to form said prosthetic device.

37. The method of claim 36, which includes the step of applying the layer of said biomaterial so that it surrounds said support member.

38. The method of claim 36, which includes the step of forming said biomaterial by polymerization.

F3

39. The method of claim 36, which includes the step of molding said biomaterial of a suitable size and shape.

~~40. Cancelled.~~

F4

41. The method of claim 36, which includes the step of forming said biomaterial into a sheet or tube, and then covering said support member with said sheet or tube.

42. The method of claim 36, which includes the step of applying said biomaterial layer to said support by grafting.

43. The method of claim 36, which includes the step of applying said biomaterial layer to said support by mechanical bonding.

44. The method of claim 36, which includes the step of applying said biomaterial layer to said support by laser bonding.

45. The method of claim 36, which includes the step of incorporating a drug into said biomaterial layer thereby decreasing the need for systemic intravenous or oral medications.

46. The method of claim 36, wherein said support member comprises titanium, tantalum, stainless steel or nitinol.

47. (Third Amended) A method for producing a biomaterial, which comprises:
providing a polymerizable monomer consisting essentially of tropoelastin;

polymerizing said polymerizable monomer to form a polymer consisting essentially of tropoelastin; and

forming said biomaterial from said polymer.

48. The method of claim 100, wherein the tissue substrate is selected from a group consisting of bladders, intestines, tubes, esophagus, ureters, arteries, veins, stomachs, lungs, hearts, colons, and skin.

4

Sub G47

49. The method of claim 100, which further includes the step of forming a three-dimensional support structure wherein said material is combined with a stromal support matrix populated with actively growing stromal cells.

50. The method of claim 49, wherein the stromal support matrix comprises fibroblasts.

51. The method of claim 47, which further includes the step of forming a cellular lining of human cells on one of the major surfaces of said biomaterial.

52. The method of claim 51, wherein said human cells are selected from a group consisting of endothelial cells, epithelial cells and urothelial cells.

53. The method of claim 100, which further includes the step of forming an inner lining for mechanical human structures to ensure their continued internal use in a human body.

54. The method of claim 100, which further includes the step of forming an inner lining in heart valves, heart implants, dialysis equipment, or oxygenator tubing for heart-lung by-pass systems.

55. The method of claim 47, which includes the step of introducing a drug into said biomaterial.

56. Cancelled.

57. Cancelled.

58. Cancelled.

59. Cancelled.

60. Cancelled.

61. Cancelled.

62. Cancelled.

63. Cancelled.

64. Cancelled.

65. Cancelled.

66. Cancelled.

67. Cancelled.

68. Cancelled.

69. Cancelled.

70. Cancelled.

71. Cancelled.

72. Cancelled.

73. Cancelled.

F5

74. A method for producing a biomaterial consisting essentially of tropoelastin joined to a tissue substrate comprising:

providing a layer of said biomaterial having a first and second outer major surface; and

applying an energy absorbing material, which is energy absorptive within a predetermined range ~~of light~~ wavelengths, to a selected one of said first and second outer surfaces of the biomaterial in an amount which will cause fusing together of one of said first and second outer surfaces ~~of the~~ biomaterial and an outer surface of said tissue substrate, said energy absorbing material penetrating into the interstices of said biomaterial,

the selected one of said first and second outer surfaces of the biomaterial being capable of joining together with the outer surface of the tissue substrate by irradiating the energy absorbing material with light energy in a predetermined wavelength range with an intensity sufficient to facilitate said joining together of said biomaterial and said tissue substrate.

75. Cancelled.

F4

76. A method for producing a biomaterial consisting essential of tropoelastin fused onto a tissue substrate comprising:

providing a layer of said biomaterial having a first and second outer major surface and a tissue substrate having a first and second outer major surface; and

applying an energy absorbing material, which is energy absorptive within a predetermined range of light wavelengths, to a selected one of said first and second outer surfaces of the biomaterial in an amount which will cause fusing together of one of said first and second outer

surfaces of the biomaterial and one of said first and second outer surfaces of said tissue substrate, said energy absorbing material penetrating into the interstices of said biomaterial;

irradiating the energy absorbing material with light energy in said predetermined wavelength range with an intensity sufficient to fuse together one of said first and second outer surfaces of the biomaterial and the tissue substrate; and

fusing together the selected one of said first and second outer surfaces of the biomaterial and the tissue substrate.

77. The method of claim 76, which further includes the step of indirectly irradiating said energy absorbing material by directing the light energy first through the biomaterial or tissue substrate and then to the energy absorbing material.

78. The method of claim 76, wherein said energy absorbing material comprises a biocompatible chromophore.

79. The method of claim 76, wherein said energy absorbing material comprises an energy absorbing dye.

80. The method of claim 76, which further includes the step of substantially dissipating said energy absorbing material when said biomaterial and said tissue substrate are fused together.

81. The method of claim 76, which further includes the step of staining the first or second surface of said biomaterial with said energy absorbing material.

82. The method of claim 76, which further includes the step of applying said energy absorbing material to one of said outer surfaces of said biomaterial by doping a separate biomaterial layer with an energy absorbing material, and then fusing the doped separate biomaterial layer to the biomaterial.

83. The method of claim 76, wherein the energy absorbing layer is substantially uniformly applied to a selected one of said first and second outer surfaces of the biomaterial.

84. The method of claim 76, which further includes the step of covering substantially the entire outer surface of the biomaterial with the energy absorbing material.

85. The method of claim 76, which further includes the step of irradiating the energy absorbing material with light energy at a localized temperature of from about 40 to 600 degrees C. for period of time sufficient to cause fusing together of one of said first and second outer surfaces of the biomaterial and one of said first and second outer surfaces of said tissue substrate.

86. The method of claim 76, wherein the tissue substrate is a live tissue substrate.

87. The method of claim 76, wherein the average thickness of the energy absorbing material which penetrates into the interstices of the biomaterial is from about 0.5 to 300 microns.

88. The method of claim 76, which further includes the step of arranging the magnitude of the wave length, energy level, absorption, and light intensity during irradiation with light energy of the energy absorbing material, and the concentration of the energy absorbing material, so that the localized temperature at the interface of said first and second outer surfaces of the biomaterial and the tissue substrate are maintained at from about 40 to 600 °C., thereby fusing together the biomaterial and the tissue substrate.

89. ~~The method of claim 76, wherein so that the tissue substrate is a live tissue substrate.~~

90. The method of claim 76, wherein the tissue substrate is selected from a group consisting of bladders, intestines, tubes, esophagus, ureters, arteries, veins, stomachs, lungs, hearts, colons, and skin.

91. The method of claim 76, which further includes the step of forming an into a three-dimensional support structure wherein said material is combined with a stromal support matrix populated with actively growing stromal cells.

92. The method of claim 91, wherein a stromal support matrix comprises fibroblasts.

93. The method of claim 76, which further includes the step of forming a cellular lining of human cells on one of the major surfaces of said biomaterial layer.

94. The method of claim 93, wherein said human cells are selected from a group consisting of endothelial cells, epithelial cells and urothelial cells.

95. The method of claim 76, which further includes the step of forming an inner lining of said biomaterial for mechanical human structures to ensure their continued internal use in a human body.

96. The method of claim 95, which further includes the step of forming said inner lining in heart valves, heart implants, dialysis equipment, or oxygenator tubing for heart-lung by-pass systems.

97. The method of claim 76, which includes the step of introducing a drug into said biomaterial.

98. A method for using a biomaterial consisting essentially of tropoelastin as a tissue-fusible layer, comprising:

providing a layer of a biomaterial consisting essentially of tropoelastin having a first and second outer major surface which is useable as a tissue-fusible material;

providing a tissue substrate having a first and second outer major surface; and

applying an energy absorbing material, which is energy absorptive within a predetermined range of light wavelengths, to one of said first and second outer surfaces of the biomaterial in an amount which will make said biomaterial tissue-fusible, and which will cause fusing together of one of said first and second outer surfaces of the biomaterial and one of said first and second outer surfaces of said tissue substrate, said energy absorbing material being applied so that it will penetrate into the interstices of said biomaterial,

irradiating the energy absorbing material with light energy in said predetermined wavelength range with an intensity being sufficient to fuse together one of said first and second outer surfaces of the biomaterial and the tissue substrate.

99. A method for producing an biomaterial fused onto a tissue substrate comprising:

providing a layer consisting essentially of biomaterial having a first and second outer major surface and a tissue substrate having a first and second outer major surface;

applying an energy absorbing material, which is energy absorptive within a predetermined range of light wavelengths, to one of said first and second outer surfaces of the biomaterial in an amount which will cause fusing together of one of said first and second outer surfaces of the biomaterial and one of said outer surface of said tissue substrate, said energy absorbing material penetrating into the interstices of said biomaterial;

indirectly irradiating the energy absorbing material by directing the light energy first through the biomaterial or tissue substrate and then to the energy absorbing material, said light energy being in said predetermined wavelength range with an intensity sufficient to fuse together one of said first and second outer surfaces of the crosslinked biomaterial and the outer surface of said tissue substrate; and

fusing together one of said first and second outer surfaces of the crosslinked biomaterial and the outer surface of said tissue substrate and substantially dissipating said energy absorbing material when said crosslinked biomaterial and said tissue substrate are fused together.

100. (Amended) The method of claim 47, wherein said biomaterial is attached to a tissue substate.

101. A method for producing a tropoelastin biomaterial, which comprises:

providing a monomer consisting essentially of tropoelastin;

polymerizing said tropoelastic monomer to form a polymer consisting essentially of tropoelastin;

forming a biocompatible tropoelastin biomaterial from said tropoelastin polymer; and

forming a three-dimensional support structure wherein said tropoelastin biomaterial is combined with a stromal support matrix populated with actively growing stromal cells.

102. The method of claim 101, wherein the stromal support matrix comprises fibroblasts.

103. (Amended) A method for producing a tropoelastin biomaterial, which comprises:

providing a monomer consisting essentially of tropoelastin;

polymerizing said tropoelastic monomer to form a polymer consisting essentially of tropoelastin;

forming a tropoelastin biomaterial from said tropoelastin polymer; and

forming a cellular lining of human cells on one of the major surfaces of said tropoelastin biomaterial.

104. The method of claim 103, wherein said human cells are selected from a group consisting of endothelial cells, epithelial cells and urothelial cells.